Dr. Eva C. Herbst

Postdoctoral Fellow in Shoulder Biomechanics

Address: Laboratory for Orthopaedic Technology
GLC H22, Gloriastrasse 37/39, 8006 Zurich, Switzerland
email: eva.herbst@hest.ethz.ch

Website - **GoogleScholar** - **Github** - **Figshare** - **Morphosource** - **Publons** - **Orcid**

Education

Oct 2016 - April 2020	PhD in Biomechanics and Palaeontology *Structure and Motion Lab, Royal Veterinary College, London*
August 2012 - May 2016	B.A. in Integrative Biology *U.C. Berkeley*
Oct 2013 - June 2014	Degree of Higher Education in Biomedical Sciences *Durham University*, Year of Study Abroad, Certificate of Higher Education

Employment & Research Experience

MAR 2023 - present	Postdoctoral Fellow *Computational Shoulder Biomechanics, ETH and Schulthess Clinic, Zurich*
Dec 2019 - present	Postdoctoral Researcher *Investigating form and function of Triassic reptile skulls, Palaeontological Institute and Museum, University of Zurich*
Oct 2019 - present	Lead Researcher OATech+ Network Pump Priming Project *Analysing bony architecture to monitor osteoarthritis of the knee* *Royal Veterinary College, London and University of Zurich*
Oct 2019 - Dec 2019	OATech+ Network Early Career Researcher Placement *Osteoarthritis project, Skeletal Biology Group, Royal Veterinary College London*
Oct 2016 - April 2020	PhD in Palaeontology and Biomechanics *Structure and Motion Lab, Royal Veterinary College, London*
May 2016 - Jul 2016	National Science Foundation Research Experience for Undergraduates Project: *Comparative Biomechanics, Palaeontology, and Evolution, University of Missouri*
Sep 2015 - May 2016	Undergraduate Research Apprenticeship Program *Hummingbird Flight Analysis, U.C. Berkeley*
Sep 2014 - May 2016	Research Assistant and Archivist *Human Evolution Research Center, U.C. Berkeley*
Jun 2013 - may 2016	Research Intern and Staff *Safari West Osteology, Santa Rosa, California*
Sep 2014 - May 2015	Undergraduate Research Apprenticeship Program *Rodent Mandible Morphology Project, U.C. Berkeley*

Honors & Awards

2021 | **D. Dwight Davis Award, Society of Integrative and Comparative Morphology**
Best student oral presentation in the Division of Vertebrate Morphology

2020 | **Swiss Commission of Palaeontology Prize**
Best presentation in palaeontology given at the Swiss Geoscience Meeting

2016 | **Franklin M. Henry Award, Integrative Biology, UC Berkeley**
Outstanding achievement in human performance and health research

2016 | **Distinction in General Scholarship, UC Berkeley**
Awarded to graduates achieving high grade point average

2013, 2015 | **Dean's Honors, UC Berkeley**
Awarded to graduates achieving high grade point average

Peer-Reviewed Publications

* denotes co first author

2023 | Merten, L.J.F, Manafzadeh, A.R., **Herbst, E. C.**, Amson, E., Tambusso, P.S., Arnold, P., Nyakatura, J.A. The functional significance of aberrant cervical counts in sloths: insights from automated exhaustive analysis of cervical range of motion. *In Press for Proc. R. Soc. B.*

2023 | **Herbst, E. C.***, Evans, L.A.*, Felder, A.A., Javaheri, B. and Pitsillides, A.A. 3D profiling of mouse epiphyses across ages reveals new potential imaging biomarkers of early spontaneous osteoarthritis. *Journal of Anatomy*

2023 | Demuth, O. E., **Herbst, E. C.**, Polet, D. T., Wiseman, A. L. A., Hutchinson, J. R. Modern three-dimensional digital methods for studying locomotor biomechanics in tetrapods. *Journal of Experimental Biology*

2022 | **Herbst, E. C.**, Lautenschlager, S., Fioritti, N., Meade, L., Scheyer, T.M. A toolbox for the retrodeformation and muscle reconstruction of fossil specimens in Blender. *Royal Society Open Science*

2022 | **Herbst, E. C.**, Eberhard, E., Richards, C., Hutchinson, J.R. *In vivo* and *ex vivo* range of motion in the fire salamander *Salamandra salamandra*. *Journal of Anatomy*

2022 | **Herbst, E. C.***, Eberhard, E.*, Hutschinson, J. R., Richards, C. Spherical frame projections for visualizing joint range of motion, and a complementary method to capture mobility data. *Journal of Anatomy*

2022 | **Herbst, E. C.***, Manafzadeh, A. R.*, Hutchinson, J. R. Multi-joint analysis of pose viability and supports the possibility of salamander-like hindlimb configurations in the Permian tetrapod *E. megacephalus*. **Student Awardee Paper**. *Journal of Integrative and Comparative Anatomy*

2021 | **Herbst, E. C.**, Lautenschlager, S., Bastiaans, D., Miedema, F., Scheyer, T. M. Modeling tooth enamel in FEA comparisons of skulls: comparing common simplifications with biologically realistic models. *iScience 24(11)*

2021 | **Herbst, E. C.**, Felder, A. A., Evans, L. A. E., Ajami, S., Javaheri, B., Pitsillides, A. A. A new straightforward method for semi-automated segmentation of trabecular bone from cortical bone in diverse and challenging morphologies. *Royal Society Open Science* 8(8). Our image was selected for the journal cover

2020 | Ortega-Jimenez, V. M., **Herbst, E. C.**, Leung, M. S., and Dudley, R. Natural barriers: waterfall transit by small flying animals. *Royal Society Open Science* 7201185

2019 | **Herbst, E. C.**, Doube, M., Smithson, T. R., Clack, J., and Hutchinson. J. R. Bony lesions in early tetrapods and the evolution of mineralized tissue repair. *Paleobiology* 45(4)

2010 | **Herbst, E. C.** and Hutchinson, J. R. New insights into the morphology of the Carboniferous tetrapod *Crassigyrinus scoticus* from computed tomography. *Earth and Environmental Science Transactions of The Royal Society of Edinburgh* 109(1-2)

Grants & Funding

2023 | **Digital Switzerland Boost Programme**
grant for attending Advanced 3D Slicer Programming Course
Funds: 420 CHF

2021 | **ImagingBioPro Network Online Educational Material Grant**
development of educational materials (videos and guides) and code: mesh manipulation and trabecular segmentation
Funds: 1,000 GBP

2020 | **University of Zurich GRC Grant**
Project: organized and hosted finite element analysis conference and workshop with over 200 participants and developed a website and Github organisation for sharing finite element modeling methods
Funds: 10,000 CHF

2019 | **OATech+ Network Biomechanics and Mechanobiology Pump Priming Fund**
Project: Using 3D trabecular architecture as a biomarker to identify and monitor osteoarthritis of the knee
Funds: 10,000 GBP

2019 | **OATech+ Network Early Career Researcher Placement**
Placement with Prof Andrew Pitsillides at RVC to work on osteoarthritis project (see above)
Funds: 3,000 GBP

2019 | **Royal Veterinary College Foreign Travel Fund**
To present research at ICVM conference
Funds: 300 GBP

2018 | **Royal Veterinary College Foreign Travel Fund**
To present research at SICB conference
Funds: 300 GBP

2016 | **Research Experience for Undergraduates, National Science Foundation**
Biomechanics research internship, University of Missouri
Funds: 3,500 USD

Conference Presentations & Invited Talks and Workshops

- gave 10 invited talks and 10 international conference presentations, and collaborator or mentor on 13 additional conference presentations
- winner of 2 awards for best talk
- please see a full list of my talks here

Teaching & Supervision

Teaching	• Bio 262: Evolutionary Morphology of Vertebrates: Issues and Methods, University of Zurich. Leader of Practicals. 2021,2022 • Bio 267, Paleobiology and Evolution of Vertebrates, University of Zurich. Leader of Practicals, 2021,2022 • Lectures: *Using Computer Tools to Investigate Biomechanics of Animals*, Bio 262 & 267, 2020-2022.
Supervision	• supervision of 2 Master's thesis projects and 1 Master's semester project in Biomechanics, ETH (current) • Kehan Pan, Semester Project FEA, ETH, Zurich (2022) • Dylan Bastiaans, PhD student Digital Palaontology and Biomechancis, UZH (2019-2023) • student course projects in Bio 262 and 267, UZH (2019-2022)
Tutoring	• Postgraduate Writing Tutor, Royal Veterinary College, London (2017-2019) • Private Tutor (Writing, Math)

Technical Skills & Programs

CT segmentation and 3D modeling	Mimics, Avizo, Blender, Rhino, photogrammetry
Analysis and Scripting	Matlab, Python, Java
finite element analysis & multibody dynamics	Hypermesh, Abaqus, Artisynth
scientific rotoscoping and animation	Maya
motion capture	Qualysis and Matlab
Version Control, Formatting	Git, Latex
Other	Joint dissections

Open Access Work

New Methods/Code	• Python-based Blender plugin for modelling 3D muscles • method for visualizing joint range of motion • method for automatic segmentation of trabecular bone featured in Avizo webinar • Blender remeshing guide for FEA
FEZ initiative	Founder of Finite Element Zurich
CT data and 3D models	available on Morphosource and Figshare
Open Access Course	Completed Open Life Science Program fall 2020

Professional Service & Leadership

2021 - Present	Leading Artisynth Software Discussion Group
2020	organized Finite Element Analysis Conference and Workshop (200+ participants)
2018	Session Chair, Society of Integrative and Comparative Biology Annual Meeting, San Francisco.

Peer Review	PNAS, Clinical Biomechanics, The Anatomical Record, Journal of Anatomy, Integrative Organismal Biology, Methods in Ecology and Evolution Integrative and Comparative Biology, Canadian Journal of Earth Sciences

Outreach & Volunteering

2021 - Present	Volunteering as English and Math tutor for refugees Students Across Borders
2022	Outreach video for Biomechanics Research and Innovation Challenge
2020	Interview with Real Scientists DE (in German)
2019	Outreach display, Early Tetrapod Evolution Night at the Vet College, Royal Veterinary College, London
2017	Outreach display, Early Tetrapod Evolution Annual Open Day, Royal Veterinary College, London
2017	Guest blog post about *Crassigyrinus* on Anatomy to You blog
2013-2016	Comparative anatomy outreach events at Safari West Wildlife Park

Professional Development & Certificates

2023	Advanced 3D Slicer Course: Scripting and Customization, Kitware
2022	Good Clinical Practice online course and certification
2022	Data Analysis for Medical Research using R, UZH
2021	GAMMA Workshop Balgrist, Zurich: "Models, methods and functional tests in motion analysis". Accredited by Swiss Orthopaedics (6 credits) and Physio Swiss (12 credits)
2021	Scientific Programming with Python, Physics Department, UZH
2020	Open Life Science Course
2020	SlicerMorph 3D Morphometrics Course
2019	Avizo Course, 3DMAGINATION Ltd.
2018	MatLab Fundamentals Course
2017	Teaching and Learning in Higher Education Certificate, Royal Veterinary College, London

Languages

English:	fluent
German:	fluent